

CLAIMS

1. A capacitor unit comprising:

5 a capacitor block formed by incorporating a plurality of capacitors into a holder with body portions of the capacitors sandwiched and electrically connecting the capacitors in series or in parallel;

a control circuit portion including a charging and discharging circuit for charging or discharging the capacitor block;

10 a relay connector for electrically connecting the capacitor block and the control circuit portion; and

a case housing the capacitor block, the control circuit portion and the relay connector,

wherein the control circuit portion comprising:

a circuit board;

15 a circuit component forming the charging and discharging circuit;

a heat radiator for suppressing heat generation of the circuit component in charging and discharging;

a microcomputer for detecting and controlling states of the charging and discharging circuit and the capacitor block; and

20 a connector connected to an external load; and

wherein the control circuit portion is incorporated into the case in a way in which the circuit board is housed in the case in an upright position with respect to the case.

25 2. The capacitor unit according to claim 1, wherein the control circuit portion is housed in the case in a way in which a surface on which the circuit component forming the charging and discharging circuit and the heat radiator

are mounted is located opposite side to the capacitor block.

3. The capacitor unit according to claim 1, wherein the heat radiator has a fixing hole, the case has a fixing boss corresponding to the hole formed on the 5 heat radiator, and the hole and the boss are screwed to be fixed in the case.

4. The capacitor unit according to claim 3, wherein a concave hole capable of being fitted into a periphery of the fixing boss formed in the case is provided on a side of a case surface of the hole of the heat radiator.

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5. The capacitor unit according to claim 4, wherein a periphery of the circuit board, which is fixed by the hole of the heat radiator and the fixing boss, is maintained in a free state in the case.

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6. The capacitor unit according to claim 1, wherein the circuit component requiring heat radiation is pressure welded to the heat radiator with a pressure suitable for heat radiation.

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7. The capacitor unit according to claim 6, wherein the circuit component is pressure welded to the heat radiator by using an elasticity of a leaf spring attached to the heat radiator.

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8. The capacitor unit according to claim 7, wherein the leaf spring is processed in a rectangular U shape, in which one end has a surface that is brought into contact with a rear surface of the heat radiator and another end has a pressure welding portion that allows the circuit component to be pressure welded to the heat radiator, and a center portion thereof is fixed to the heat

radiator with a screw.

9. The capacitor unit according to claim 8, wherein the leaf spring has a guide portion for guiding a vertical direction of the circuit component so that
5 the circuit component is not fallen in a right and left direction.

10. The capacitor unit according to claim 8, wherein the circuit component requiring heat radiation is pressure welded to the heat radiator via grease for promoting heat radiation.

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11. The capacitor unit according to claim 8, wherein pressure welding force of the leaf spring to the circuit component is 0.1 N to 4.5 N.

12. The capacitor unit according to claim 8, wherein the leaf spring is
15 connected so that a plurality of the circuit components can be pressure welded simultaneously.

13. The capacitor unit according to claim 1, wherein:

the control circuit portion is incorporated into the case with covered
20 with a shield case which are divided into an upper shield case and a lower shield case;

the lower shield case has one or more fixing pieces to be fixed to the case, the fixing piece being obtained by allowing a part of the lower shield case to rise;

25 the case has a screw-fixing boss at the position corresponding to the fixing piece;

a ground terminal extends from a ground of the circuit board; and

the ground terminal and the lower shield case are together fastened to the fixing boss with a screw.

14. The capacitor unit according to claim 13, wherein the upper shield case
5 has a guide surface positioned on an inside of a wall surface of the lower shield case and a guide surface positioned on an outside of a wall surface of the lower shield case; and

the upper shield case and the lower shield case are fitted into each other at the guide surface.

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15. The capacitor unit according to claim 13, wherein

the upper shield case has a first guide surface and a second guide surface;

15 the first guide surface and the second guide surface or both are processed to be deformed in the direction in which the first guide surface and the second guide surface become close to each other, thereby preventing looseness in fitting when they are fitted into the lower shield case.

16. The capacitor unit according to claim 15, wherein at least one of the
20 first guide surface and the second guide surface and a wall surface of the lower shield case have one or more pairs of fitting portions of a hole and a boss on each corresponding position, thereby regulating the positions thereof when they are incorporated into each other.

25 17. The capacitor unit according to claim 13, wherein the lower shield case or/and the upper shield case have, on the side surface thereof, a rise whose dimension is slightly larger than a dimension of an internal surface of a housing

portion of the case, and the shield case is housed in the case without looseness.

18. The capacitor unit according to claim 13, wherein the lower shield case or the upper shield case has a piece that is folded outwardly from the side surface, and the piece is led to the side surface of the case and connected to a ground of an external load through a ground connection.
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19. The capacitor unit according to claim 18, wherein an outer peripheral surface of the case is provided with a screw fixing nut for fixing a bracket to be attached to a fixed body; and the piece that is folded outwardly from the side surface of the lower shield case is fixed to the bracket together with the screw fixing nut of the case.
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20. The capacitor unit according to claim 1, wherein a connector for electrically connecting the capacitor block and the control circuit portion is configured by using a plurality of connectors having current capacity that is smaller than the current capacity necessary for charging and discharging.
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21. The capacitor unit according to claim 1, wherein a connector that is electrically connected to an outside of the control circuit portion is protruded from a part of the case and the periphery thereof is provided with a protection wall formed on the case.
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